

in complexity, and reached its preeminent position when the phenomenon of "man" became the object of study. Thus were born the "borderline" sciences, whose history and implications are set forth with great clarity by Norbert Wiener in his book on Cybernetics.<sup>3</sup>

This mergence of sciences implies quite clearly that humanity, emerging from the era of specialization, is moving toward the "universality of knowledge" which characterized the human tendency of say a century ago. The universality we are approaching now is, however, infinitely more complex than the universality of a hundred years ago. One hundred years ago it was possible for a scientist to know all the information available at that time in all branches of knowledge. Earlier still, a "physicist" needed to know only the three basic elements — water, air, and fire — in order to "understand" the whole universe. Now, in order to grasp what is known of the ten or so elementary particles of the nucleus one has to spend ten years in sustained and highly specialized study.

In the light of this situation it becomes clear that discrete domains of physics can be enlarged only by a gifted and privileged few because the subject is already so far advanced and involved. Most of us may hope to understand only a fraction of a branch of science. Consequently, it is not only impossible to be universal in all sciences, one cannot be universal even in one science. The borderline sciences, however, can be advanced by common effort on the part of different specialists who speak a common language.

To participate in the borderline sciences demands on the one hand a profound knowledge of a particular field and on the other hand some understanding of other fields or at least of the language of the others. If this is so in the realm of science, it is still more so in the domain of the social sciences.

If this outline of the present situation is valid, if the factors I have mentioned grow more and more dominant in the development of human knowledge, then teaching physics to students of the humanities acquires a definite reason. In the future the student will, as a matter of course, encounter the scientific approach to, and scientific interpretation of, various data and therefore will have to carry with him a training enabling him to understand and to perform these processes.

Of what does this training consist, aside from accumulating positive data which can be acquired from any textbook? In my opinion it consists mainly in the development of the capacity of systematic analysis of data — any data — followed by equally strict and systematic synthesis.

To acquire this capacity the mind has to be trained to a mental discipline. (So far as I know, this discipline can be acquired best and most broadly through the study of the precise sciences, among which physics represents a particularly adequate operational medium because it requires one or more strictly logical sequences of ideas within definite limits.) Furthermore, the knowledge of physics, which is the root of several branches of human knowledge, will allow the student to approach, understand, and correlate a great many borderline subjects.

Thus physics as a subject of the "Humanities" curriculum becomes primarily not a goal but a means of developing the mind so that it